PSC Overview Series . . .
Electric Energy Efficiency

This Overview contains information about planning efforts, programs, and technologies to promote energy efficiency in Wisconsin. Energy efficiency is considered an important part of the statewide electric system.

Why Should Consumers be Concerned About the Efficient use of Electricity?

The efficient use of electricity helps keep utility bills low, preserves the environment, and benefits the state's economy.

Utilities must supply power to meet the demand for electricity. As the demand for electricity increases, more power plants and lines must be built and operated adding to the cost of meeting energy needs. These costs must be paid by the utilities' customers: individuals, employers, and manufacturers of Wisconsin. As more energy is used, more fuel must be burned, most of which comes from suppliers outside Wisconsin. Efficient energy use means fewer dollars leave the state. Since the production and distribution of electricity affects the environment, efficient use minimizes the impact.

Public Service Commission role in promoting energy efficiency

The Public Service Commission (PSC) reviews utility energy efficiency activities in three types of proceedings: the Strategic Energy Assessment (SEA), transmission construction cases, and rate cases.

In the SEA, a proceeding to review the status of generation and transmission capacity, the PSC identifies activities to discourage inefficient and excessive power use over a three-year period.

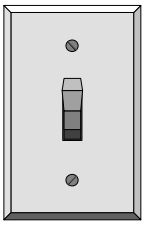
In transmission construction cases, where a utility proposes to build new power lines, the PSC determines if sufficient consideration was given to energy efficiency as an alternative.

In rate cases, where changes in electric rates are considered, the PSC determines an appropriate budget and sets short-term goals (one to two years) for energy efficiency activities. The PSC also monitors the programs designed to achieve these activities.

There is a national trend to deregulate electric utilities in much the same way that telecommunication companies and airlines were deregulated. This will affect the utilities' roles in providing energy efficiency services. The PSC has recently developed a plan to decrease the utilities' responsibility to implement efficiency programs for customers and to increase the provision of such programs in the competitive market. This plan will take several years to implement successfully and must, first, be approved by the Legislature. The goal of this effort is to recognize the potential of small business and other providers of efficiency services and to give customers a choice of provider. The mechanism to achieve this shift is proposed to be a "Public Benefits" fund supported by all retail electric providers to finance development of the energy efficiency market.

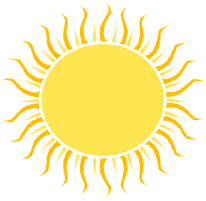
How can Consumers use Energy More Efficiently?

The most common methods of improving energy efficiency are conservation, load management, and fuel substitution.



Customers can conserve energy resources by reducing energy use, increasing efficiency, or using renewable sources of energy. Most consumers are familiar with ***conservation*** techniques such as turning off lights when leaving a room or turning down furnace thermostats at night.

Energy efficiency means using the minimum amount of energy necessary to accomplish a task. For example, it takes less heat and air conditioning to stay warm or cool in a properly insulated home than in an uninsulated one. Another example is the use of compact fluorescent light bulbs rather than incandescent. These bulbs can provide the same amount of light as conventional incandescent light bulbs using one quarter of the energy.



Customers can also reduce electricity use by using renewable energy. Examples include heating water with solar power rather than electricity and using natural light rather than artificial light whenever possible.

Load management shifts energy use away from periods when demands are highest. On a hot summer weekday, when air cooling systems in homes and at commercial and industrial facilities cause the daily demand for energy to reach its highest point, utilities run more costly power plants and use more expensive fuels. Load management can decrease the use of these plants or delay the need for new power plant construction.

Many utilities offer load management programs, such as air-conditioner control programs. Air-conditioner control programs require that the utility install a radio-activated device that, when signaled, controls the customer's air conditioner, turning it off when demand on the system reaches a predetermined level. In these programs, customers receive a bill credit, a lower rate, or some other type of incentive for participating.

Fuel substitution reduces use of electricity and can usually reduce total energy use. For instance, natural gas ranges and water heaters generally use less total energy than their electric counterparts.

What is the Utilities' Role in Promoting Energy Efficiency?

The PSC has been directing Wisconsin utilities to offer their customers energy efficiency services for many years. The PSC believes it is part of a utility's responsibility to make sure customers' bills are as low as they can be considering each customer's energy requirements. Customers who install energy efficient measures can reduce their utility bills. Also, lower electric bills keep utility business customers more competitive, thereby improving the economy in a utility's service area.

Energy Efficiency is an Alternative to Building New Power Plants

The two primary ways of responding to a growing need for energy are to increase the energy supply or to decrease demand by improving energy efficiency or discouraging wasteful energy use, for example.

These are several options for supplying energy needs. New power plants and lines are considered "supply-side" options. "Demand-side management" (DSM) options are measures taken to affect the demand for electricity by helping consumers become more efficient energy users.

Energy from renewable resources is also a potential way to address future energy needs. For example, wind can be used to generate electricity and solar energy can heat water. Customers who choose to use energy produced this way reduce the total amount of energy purchased from the local utility. (See the Overview entitled "Renewable Energy Resources" for more information.)

How can Energy Efficiency Offset the Need for new Power Plants and Power Lines?

By reducing overall electricity use, improved energy efficiency can delay or eliminate the need to build new power plants. When it costs less to implement a DSM program than to build a new power plant, it makes sense for the utility or independent contractor to choose the DSM program.

What Kind of Programs are Utilities and Independent Contractors Implementing to Encourage the Efficient use of Energy?

Wisconsin utilities and independent contractors offer a variety of energy efficiency programs which are constantly revised to reflect new information, to increase their effectiveness, and to respond to customer needs.

Information programs, such as home and business energy audits, suggest ways to improve the energy efficiency of buildings and equipment.

Rebate or financing programs provide financial help to customers for the purchase or installation of efficiency improvements or to change to another type of fuel. For example, some utilities offer loans to customers who purchase high-efficiency motors for their industrial process.

Rate options are also offered by many utilities. One example is a time-of-use (TOU) rate. When demand for electricity is high, the utility's cost for serving that demand is also high. Customers on TOU programs pay more for electricity used during peak hours, but much less for energy used off peak. This encourages off-peak use and conservation at the time of the peak.

What are the new Trends in Energy Efficiency Programs?

Energy efficiency programs have gone through many changes in the past 15 years. For over ten years, programs concentrated on providing information. Customers were encouraged to weatherize their homes, turn down thermostats, and turn off lights when leaving a room. Many utilities offered home audits to suggest ways to save energy but customer response was minimal. When utilities began to offer financial incentives, primarily in the form of rebates, the response improved.

In recent years, utilities have been moving away from rebates and toward identifying and removing market barriers to customer participation. Financing or payment plans have been offered to help customers overcome the initial hurdle presented by the higher cost of some energy efficiency options. Utilities may help customers select contractors to perform the work. In some programs, utilities pay for the installation of efficiency measures directly (usually through contractors) to get the job done. Utilities have been working with manufacturers and retailers to make sure efficient products are available for customers to purchase.

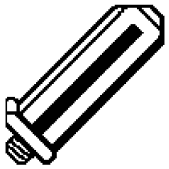
What are Some Examples of Demand-Side Programs?

Demand-side measures are options that change electricity use and include conservation, customer-owned renewable resources, load management, and fuel switching.

Conservation

Conservation results in a reduction in overall energy use and more efficient use of energy. The following are five types of conservation measures.

- ***Building shell measures*** include: insulating and weatherizing residential and commercial buildings. These measures save energy used for electric space heating and air conditioning and can increase customer comfort.
- ***Lighting measures*** include: replacing inefficient lighting, such as incandescent, with high-efficiency fluorescent or other lighting technologies; taking advantage of natural lighting; reducing unnecessary lighting levels; and increasing use of reflectors and occupancy sensors. A reduction in lighting energy use produces less heat, thereby reducing air conditioning load.



- ***Motor measures*** include: replacing motors used in commercial and industrial applications with more efficient motors; using motors with adjustable speed drives; and sizing motors properly to the tasks.
- ***Heating and cooling efficiency measures*** include replacing furnaces, water heaters, and refrigeration units with high efficiency appliances.
- ***Process measures*** change the way things are done, usually in the industrial sector, to use less energy in the process. One example is optimizing the efficiency of a production line by eliminating bottlenecks.

Customer-owned renewable resources

These measures replace electricity use with small-scale, customer-sited, renewable resource technologies. These technologies reduce use of fossil energy and may also reduce peak demand for electricity. The following are several types of customer-owned renewable resources.

- ***Solar electric*** (photovoltaics) converts sunlight to electricity.
- ***Daylighting*** uses building design (window placement, size, special glass) to reduce use of electric lights and air conditioning
- ***Passive solar*** uses building design (south facing glass, sun spaces, and thermal storage) to reduce winter heating.
- ***Solar water heaters*** produce up to 66 percent of hot water needs and are usually used in conjunction with gas or electricity as a back-up fuel source.
- ***Wind***, like solar electric, allows consumers to produce their own electricity. There are no fuel costs and no pollution in the production of electricity.
- ***Wood or biomass*** options include wood-burning stoves and boilers that burn wood chips, pellets, and chunk wood. They may also burn agricultural products, such as corn, straw, and hay.

Load management

Load management reduces the amount of electricity which is demanded at the peak. Usually, peak load is shifted to a time when there is less demand and when energy costs are lower. Examples of major forms of load management are: air conditioner control or cycling; interruptible industrial service; and cool storage systems.

Fuel switching

Fuel switching reduces both use of electricity and peak demand by replacing electric loads with energy produced from less expensive or more efficient fuels.

New approaches to DSM programming are being developed, such as the "whole house" or "whole facility" approach. Treating a business, home, or factory as a total system rather than a collection of conservation rebate opportunities can often lead to greater savings, at a lower cost.

Another new approach is the promotion of customer use of renewable resources such as natural light and solar power. Customers are encouraged to choose building designs that take advantage of natural lighting and specify solar water heaters.

What are Municipal Utilities Doing About Energy Conservation?

Most municipal utilities have lagged behind the larger, investor-owned utilities in implementing DSM programs. They have fewer resources and staff to devote to program development and administration. However, the PSC has directed the state's municipal electric utilities to offer their customers access to the bill-reducing benefits of DSM programming. Offering these benefits also helps municipal utilities compete with larger utilities in efforts to attract and retain customers.

To aid in these efforts, PSC staff has worked with the Municipal Electric Utilities of Wisconsin on a task force charged with identifying and reducing the barriers to municipal utility DSM participation. These efforts have also been facilitated by the municipals' wholesaling utilities.

What is the Overall Goal of the PSC in Encouraging Energy Efficiency?

The goal of electric energy efficiency is to reduce costs, protect the environment, and improve energy independence while providing Wisconsin consumers with the comfort, convenience, safety, and productivity they require. As the provision of efficiency services is increasingly provided by independent businesses or contractors, the PSC goals remain.

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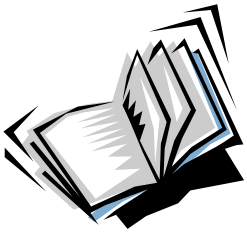

- Air Quality Issues for Electric Power Generation
- Electric Transmission Lines
- EMF -Electric and Magnetic Fields
- Environmental Impacts of Electric Transmission Lines
- Merchant Plants and Other Non-Utility Generation
- Nuclear Power Plant Decommissioning and Radioactive Waste Disposal
- Power Plant Siting
- Power Plants
- Renewable Energy Resources
- Right-of-Way and Easements in Electric Facility Construction
- Underground Electric Transmission Lines

To obtain any of these Overviews, contact Gail Hanson, by phone (608) 267-2896 or e-mail *hansog@psc.state.wi.us*, at the Public Service Commission or check our home page at : http://www.psc.state.wi.us.

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